## METHOD FOR SENDING A SHORT MESSAGE
## FROM A WIRELINE PHONE


FIELD OF THE INVENTION


The present invention relates generally to
5    communication systems, and more particularly to a method
for sending and receiving text messages from a wireline
phone in a communication system.


BACKGROUND OF THE INVENTION


Wireline Short Message Service (SMS) provides one-
10    to-one or one-to-many (broadcast) short text message
service to wireline subscriber units, and can be extended
to interwork with wireless SMS.  SMS appears to
subscriber units as a text message on the caller ID
screen.  In a wireline system, the caller ID screen will
15    be part of an external CPE.  SMS messages can be a short
application, less than or equal to fifteen characters, or
a long application, up to about 255 characters.  There
are many applications for both short and long message
services.
20    Although wireless SMS has become popular, there are
many shortcomings to this service.  First, wireless SMS
can only be sent between wireless users, and many still
do not have wireless phones.  In addition, most wireless
phone numbers are not published.  Still further, most
25    wireless phones are not always turned on.
Therefore, a need exists for a method and
communication system that allows a user to send a short
message from a wireline phone.

## BRIEF SUMMARY OF THE INVENTION

The present invention provides a method for sending and receiving text messages using the wire-line telephone network, common control switching arrangements, and
5  commonly available CPE such as DTMF telephones and caller-ID devices.

One wireline SMS application is a broadcast message system that can update parents of students who attend a school.  For example, the school can send a brief text
10  message to all parents' phones to alert them that school has been canceled.  In this embodiment, the school sends a short text message to a list of telephone numbers, which can be either wireless or wireline phones.

Further embodiments for the present invention
15  include user-controlled lists, such as those for soccer teams, clubs, and other organizations.  In addition, the present invention provides for dynamic lists, such as for a baby announcement, Public Service Announcements, such as a tornado watch, news services, such as periodic stock
20  quotes or weather.  Still further, Internet Service Provider can provide interworking, such as alerting a user when a new email arrives, law enforcement purposes, such as All Points Bulletins (APBs), and direct marketing implementations.  The Federal Trade Commission (FTC) is
25  preparing to limit unsolicited telemarketing, so the present invention would allow customers to "tune in" to streams of marketing information categorized by type, such as "channels" of interest.

The present invention modifies existing Caller ID
30  protocol to provide short text messages in MDMF format using low-speed (1200 bps) analog data transmission.  A single MDMF message supports up to 255 characters.  A switch needs to interpret incoming DTMF from an originating SMS subscriber unit as a request to send a

text message to one or more subscriber lines. Alternatively, for bulk data delivery, a more sophisticated information provider could originate message data to the switch using higher bandwidth methods

5    such as ISDN.  The switch needs to send outgoing SMS text to terminating wireline SMS subscriber units with the appropriate display technology, which is FSK for traditional analog lines and ISDN information elements for digital ISDN phones.  For use with wireless phones,

10   the originating wireline switch would formulate a Wireless SMS request message and send it via the SS7 network to the wireless subscriber's Mobile SMS server. The SMS server would then deliver the text message to the subscriber.

15       The present invention utilizes call processing signaling methods to alert the receiving station of an incoming message and subsequently to deliver the message. Text messages can be FSK transmission, ISDN information elements, or a voice announcement.  For example, a text-

20   to-speech conversion may be performed by the switching system.  Alerting options include using suppressed ringing to deliver message without ringing the line, delivering the message as part of a calling name parameter during normal alerting, ISDN D-channel (out of

25   band) message(s), or using normal ringing and sending the FSK after answer on an adjunct CPE or computer-only line. The suppressed ringing would preferably integrate a CPE wakeup tone transmitted by the switch.  The normal ringing option works with existing modem-type devices.

30   Additionally, a text message could be scheduled at a targeted date and time for delivery.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

FIG. 1 depicts a plurality of subscriber units connected to a wireline communication system in accordance with an exemplary embodiment of the present

5    invention.

FIG. 2 depicts a call flow diagram in which a subscriber unit wants to send a message to a second subscriber unit.

FIG. 3 depicts a call flow diagram in which a

10   subscriber unit wants to send a message to a subscriber list.

FIG. 4 depicts a call flow diagram in which an originating subscriber unit connected to a first switch sends a message to a subscriber list that includes a

15   first subscriber unit connected to the first switch and a second subscriber unit connected to a second switch.

FIG. 5 depicts a call flow diagram in which a subscriber unit wants to send a message to a subscriber list by utilizing a gatekeeper database that provides

20   storage and retrieval of the subscriber list.

FIG. 6 depicts a call flow diagram in which an originating subscriber unit connected to a first switch. sends a message to a subscriber list stored by a gatekeeper database and includes a first subscriber unit

25   connected to the first switch and a second subscriber unit connected to a second switch.

FIG. 7 depicts a call flow diagram for a method of providing near real-time filtered information delivery.

FIG. 8 depicts a call flow diagram in which a

30   subscriber unit wants to send a broadcast message to all subscriber units that subscribe to a Wireline SMS Terminating feature on a switch.

## DETAILED DESCRIPTION OF THE INVENTION

FIG. 1 depicts a plurality of subscriber units connected to a wireline communication system 100 in accordance with an exemplary embodiment of the present
5    invention.  Wireline communication system 100 preferably includes switch 101, list/filter user interface 105, switch 107, and gatekeeper database 109.  Subscriber unit 103 is connected to wireline communication system 100 through switch 101 via interface 102.  Subscriber unit
10   103 is also connected to list/filter user interface 105 via interface 104.

Switch 101 provides a wireline SMS channel 102 to subscriber unit 103.  In a preferred embodiment, switch 101 is a 5ESS Switch provided by LUCENT TECHNOLOGIES INC.
15   of Murray Hill, New Jersey.  Switch 107 performs similar functionality to switch 101, and may or may not be the same type of switch as switch 101.

Subscriber unit 103 is a user of the wireline SMS service provided by communication system 100.  An
20   originating subscriber unit sends an SMS message, and a terminating subscriber unit or subscriber units receive the SMS message.

Subscriber units 113 and 114 are connected to switch 101.  Subscriber unit 108 is served by switch 107.
25   Subscriber units 103, 113, 114, and 108 are preferably customer premises equipment (CPE), such as a landline telephone, with Caller ID capabilities.  Typical subscriber units support fifteen-character MDMF parameters which are displayed, such as a calling name.
30   Potential new CPE or PC applications will support longer messages.  A PC application could also be used to send messages and administer lists.  Further, some V.92 modems and computer telephony devices have been enhanced include functionality that allows them to receive a sequence of

GR30 analog packets. In an exemplary embodiment, modem functionality could be integrated onto the switch.

List/filter user interface 105 provides an interface to subscriber unit 103 for processing SMS lists.
5    Subscriber unit 103 can perform data base (DB) search queries utilizing list/filter user interface 105.

Gatekeeper database 109 stores SMS lists, which may be organized in such a way that the SMS lists can be searched. Gatekeeper database 109 stores and controls
10   buddy lists and information flow to and from subscriber unit 103. Gatekeeper database 109 also controls message lists and information flow to and from subscriber unit 103. Gatekeeper database 109 may optionally be an integral part of switch 101 and/or switch 107.
15

FIG. 2 depicts a call flow diagram 200 in which subscriber unit 103 wants to send a message "No Soccer" to subscriber unit 113. In the exemplary embodiment depicted in FIG. 2, subscriber units 103 and 113 are both
20   subscribed to the wireline SMS service on the same switch, switch 101. Subscriber unit 103 is subscribed to the wireline SMS origination feature, and subscriber unit 113 is subscribed to wireline SMS termination feature.

Wireline SMS groups can include all users on a
25   switch that have subscribed to the wireline SMS feature in the default list, such as for public service announcements. Alternately, wireline SMS groups can be a service-provider administered list. This could either be for a whole business telephone group or for a
30   subscription service list with a restricted set of members, such as a stock quote broadcast. Further, the wireline SMS group can be a user administered list. These user-administered lists would be able to add a user to the list, create a new list, delete an existing list,
35   etc., without telephone service provider interaction.

Subscriber unit 113 preferably includes means for displaying an incoming text message, such as an existing Caller ID display located either internally in the subscriber unit or externally in a separate device, such

5    as a Caller ID device.  Alternately, subscriber unit 113 can be a new CPE or a personal computer application, such as e-mail or instant messaging.  Further, subscriber unit 113 can include a text-to-voice converter that converts the text message to a voice message for play on a

10   suitable speaker.  Alternatively, switch 101 can perform a text-to-speech conversion for subscriber unit 113 if switch translations indicate that is the subscriber's preferred method of message delivery.

Subscriber unit 103 sends SMS request message 201 to

15   switch 101.  SMS request message 201 is preferably a preformatted message that includes a text portion, such as "No School".

SMS request message 201 can alternately be free-form text sent via wireline connection 102.  In this

20   embodiment, switch 101 interprets the DTMF digits received, the 0-9, "#", and "*" keys, as characters or numbers.

In a further alternate embodiment, SMS request message 201 can be text sent via a computer interface.

25   In this embodiment, a computer application formats a send message request to SMS request message 201 and sends SMS request message 201 over line 102 to switch 101.

SMS request message 201 can be encrypted or compressed.  For example, SMS request message 201 can be

30   compressed utilizing 6 bit ASCII mapping.

Switch 101 sends SMS request acknowledgment message 203 to subscriber unit 103.  SMS request acknowledgment message 203 alerts subscriber unit 103 that switch 101 has received the message properly.  SMS request

35   acknowledgment message 203 is preferably a tone or

announcement.  Alternatively, the acknowledgement could
be delivered via SMS.

Switch 101 sends display SMS message 205 to
subscriber unit 113.  Subscriber unit 113 may include a

5    feature that allows it to deny display of SMS message 205
based on screening the originator's DN or other
identifier, the time of day, or SMS message type
category.

Subscriber unit 113 sends display SMS acknowledgment

10   message 207 to switch 101 upon receiving display SMS
message 205.  Display SMS acknowledgment message 207
alerts switch 101 that subscriber unit 113 has received
the message properly.  In the preferred embodiment,
subscriber unit 113 validates message integrity by

15   examining the checksum and notifies switch 101 with a
DTMF acknowledgment signal.  Alternatively, switch 101
may assume the message was delivered once it has been
transmitted without waiting for acknowledgment 207 if
switch 101 translations indicate that subscriber unit 113

20   is not capable of making a response.

Switch 101 sends SMS delivery message 209 to
subscriber unit 103.  SMS delivery message 209 indicates
to subscriber unit 103 that display SMS message 205 has
been delivered to subscriber unit 113.

25   Subscriber unit 103 sends SMS delivery
acknowledgment message 211 to switch 101, to acknowledge
that it has successfully received SMS delivery message
209.


30   FIG. 3 depicts a call flow diagram 300.  In this
embodiment, subscriber unit 103 wants to send a message,
such as "No Soccer", to a subscriber list L1.  Subscriber
list L1 includes subscriber units 113 and 114.  In the
embodiment depicted in FIG. 3, subscriber units 103, 113,

35   and 114 are all depicted as being subscribed to the

wireline SMS service on the same switch, switch 101.
Subscriber units 113 and 114 have the wireline SMS
termination feature activated.

5      Subscriber unit 103 sends SMS request message 301 to
switch 101.  In one exemplary embodiment, subscriber list
L1 is part of SMS request message 301.  In a further
exemplary embodiment, subscriber list L1 is provisioned
on switch 101.  In this exemplary embodiment, switch 101
is provisioned with the value of L1 that the subscriber
10     unit 103 uses to access the list L1, along with the
directory number(s) that are members of L1.

Subscriber units may review or modify subscriber
lists stored on switch 101.  This can be accomplished via
manual modifications via DTMF digits, automated
15     modifications via DTMF digits from a wireline subscriber
unit, a Web subscriber programming candidate, or
standalone Personal Computer application.

Switch 101 sends SMS request acknowledgment message
303 to subscriber unit 103.  SMS request acknowledgment
20     message 303 alerts subscriber unit 103 that switch 101
has received the message properly.  SMS request
acknowledgment message 303 is preferably a tone or
announcement.  Alternatively, the acknowledgement could
be delivered via SMS.

25     Switch 101 sends display SMS message 305 to
subscriber unit 113.  Subscriber unit 113 may include a
feature that allows it to deny display of SMS message 305
based on screening the originator's DN or other
identifier, the time of day, or SMS message type
30     category.

Switch 101 sends display SMS message 307 to
subscriber unit 114.  Subscriber unit 114 may include a
feature that allows it to deny display of SMS message 307
based on screening the originator's DN or other

identifier, the time of day, or SMS message type
category.

Subscriber unit 113 sends display SMS
acknowledgement message 309 to switch 101 upon receiving
display SMS message 305. Display SMS acknowledgment
message 309 alerts switch 101 that subscriber unit 113
has received the message properly. In the preferred
embodiment, subscriber unit 113 validates message
integrity by examining the checksum and notifies switch
101 with a DTMF acknowledgment signal. Alternatively,
switch 101 may assume the message was delivered once it
has been transmitted without waiting for acknowledgment
309 if switch 101 translations indicate that subscriber
unit 113 is not capable of making a response.

Subscriber unit 114 sends display SMS
acknowledgement message 311 to switch 101 upon receiving
display SMS message 307. Display SMS acknowledgment
message 311 alerts switch 101 that subscriber unit 114
has received the message properly. In the preferred
embodiment, subscriber unit 114 validates message
integrity by examining the checksum and notifies switch
101 with a DTMF acknowledgment signal. Alternatively,
switch 101 may assume the message was delivered once it
has been transmitted without waiting for acknowledgment
311 if switch 101 translations indicate that subscriber
unit 114 is not capable of making a response.

Switch 101 sends SMS delivery message 313 to
subscriber unit 103. SMS delivery message 313 indicates
to subscriber unit 103 that display SMS message 305 has
been delivered to subscriber unit 113.

Subscriber unit 103 sends SMS delivery
acknowledgment message 315 to switch 101, to acknowledge
that it has successfully received SMS delivery message
313.

Switch 101 sends SMS delivery message 317 to subscriber unit 103. SMS delivery message 317 indicates to subscriber unit 103 that display SMS message 307 has been delivered to subscriber unit 114.

5      Subscriber unit 103 sends SMS delivery acknowledgment message 319 to switch 101, to acknowledge that it has successfully received SMS delivery message 315.

10     FIG. 4 depicts a call flow diagram 400 in which subscriber unit 103 and subscriber unit 113 are connected to an originating switch 101 and subscriber unit 108 is connected to switch 107. In this embodiment, subscriber unit 103 sends a message "No Soccer" to Subscriber List

15     L1, which includes subscriber unit 113 and subscriber unit 108. Subscriber units 103, 113, and 108 are all subscribed to a wireline SMS feature.

Subscriber unit 103 sends SMS request message 401 to switch 101. SMS request message 401 in this embodiment

20     includes a text portion and a destination of subscriber list L1.

Switch 101 determines the switch associated with each subscriber list L1 member. In the embodiment depicted in FIG. 4, switch 101 will send SMS request

25     message 401 directly to subscriber unit 113 which is homed on switch 101, and will forward SMS request message 401 intended for subscriber unit 108 to the switch associated with subscriber unit 108, switch 107. In an exemplary embodiment, switch 101 sends SMS request

30     messages to each of the subscriber list members by looping through the directory numbers in the subscriber list and sending an SMS request message to each of the subscriber units.

Switch 101 forwards SMS request message 403 to

35     switch 107. Switch 101 preferably utilizes out-of-band

signaling to interwork with the SS7 signaling network,
such as ISUP (ISDN User Part) and/or TCAP (Transaction
Capabilities Application Part), to correspond between
switch 101 and switch 107.  In the embodiment where
5    subscriber list L1 includes a mobile unit, out-of-band
signaling interworks with wireless SMS (Short Message
Service, an IS-41 or ETSI GSM standard) to support both
text delivery and services.  Switch 101 may also support
voice-mail notification, presence server implementation,
10   and e-mail interworking.

Switch 107 sends SMS request acknowledgment message
405 to switch 101 to indicate to switch 101 that the
message was received at switch 107.

Switch 101 sends SMS request acknowledgment message
15   407 to subscriber unit 103.

Switch 101 sends display SMS message 409 to
subscriber unit 113.

Subscriber unit 113 sends display SMS
acknowledgement message 411 to switch 101 to indicate to
20   switch 101 that subscriber unit 113 received SMS message
409 correctly.  Error processing or retransmission is
optionally done for wireline applications, but
acknowledgments are required for wireless applications.
Error processing can be accomplished using an external
25   server or utilizing stored messages.  Switch 101
preferably does not store or retransmit SMS messages.
However, acknowledgement message 411 can indicate that
SMS message 409 was not properly received.

Switch 101 sends SMS delivery message 413 to
30   subscriber unit 103.

Subscriber unit 103 sends SMS delivery
acknowledgment message 415 to switch 101.

Switch 107 sends display SMS message 417 to
subscriber unit 108.  Switch 107 determines which
35   subscriber units need to receive display SMS message 417.

It should be understood that switch 107 may forward display SMS message 417 to another switch for that switch to pass the message along to a subscriber unit connected to that switch that is a member of subscriber list L1.

5    It should also be understood that display SMS message 417 may need to be segmented into a group of smaller messages in order to fit within signaling message size limits.

Subscriber unit 108 sends display SMS acknowledgement message 419 to switch 107 to communicate

10   to switch 107 that subscriber unit 108 has properly received display SMS acknowledgement message 419.

Switch 107 forwards display SMS acknowledgement message 421 to switch 101 to alert switch 101 of the status of the delivery of display SMS message 417 to

15   subscriber unit 108.

Switch 101 sends SMS delivery message 423 to subscriber unit 103.

Subscriber unit 103 sends SMS delivery acknowledgment message 425 to switch 101.

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FIG. 5 depicts a call flow diagram 500. In the embodiment depicted in FIG. 5, subscriber unit 103 wants to send a message, such as "No Soccer", to a subscriber list L1, which includes subscriber units 103, 113, and

25   114. In the embodiment depicted in FIG. 5, subscriber units 103, 113, and 114 are subscribed to a Wireline SMS service on the same switch, switch 101. In addition, switch 101 does not provision subscriber list L1, but rather gatekeeper database 109 provisions subscriber list

30   L1.

Subscriber unit 103 sends SMS request message 501 to switch 101. SMS request message 501 includes a destination portion and a text portion. In this embodiment, the destination portion of SMS request

35   message 501 includes subscriber list L1, and the text

portion includes a message of "No Soccer". Switch 101
determines the proper action to take with regard to SMS
request message 501 based upon the destination portion of
SMS request message 501.

5      Switch 101 sends SMS request message 503 to
gatekeeper database 109. For subscriber units
provisioned by switch 101, switch 101 will send them a
message including at least the text portion of SMS
request message 501. For subscriber units that are
10   provisioned by another switch, switch 101 sends a message
to that switch to be delivered to the appropriate
subscriber units. When switch 101 does not provision
subscriber list L1, as depicted in this embodiment,
switch 101 sends the message to a gatekeeper database 109
15   that provisions subscriber list L1.

Gatekeeper database 109 sends SMS request
acknowledgment message 505 to switch 101. Gatekeeper
database 109 needs to partition subscriber list L1 and
send an SMS request message to the proper switches.
20   Gatekeeper database 109 sends a directory number list and
the text to switch 101 in SMS request acknowledgment
message 505. In the preferred embodiment, gatekeeper
database 109 utilizes a directory number (DN)-to-switch
mapping. In an alternate embodiment, gatekeeper database
25   109 utilizes an NPA+NXX-to-Destination Point Code (DPC)
mapping. Gatekeeper databases can also be used to
support out-of-network Directory Numbers.

In an alternate embodiment of the present invention,
gatekeeper database 109 can store text message
30   identifications that correspond to predetermined
messages. Gatekeeper database 109 then extracts the
identification of a message from SMS request message 503
and determines the message associated with that ID. As
an example, SMS request message 503 may include a text
35   portion of "47". Upon receiving SMS request message 603,

gatekeeper database 109 extracts the "47" from SMS
request message 503, looks up in a table or the like the
message corresponding to "47", and includes the
corresponding message in messages sent to the subscriber
units in subscriber list L1.  If the message ID for "47"
is "No Soccer", gatekeeper database 109 replaces the "47"
with "No Soccer" prior to sending a message to the
subscriber units in subscriber list L1.

In a further alternate embodiment of the present
invention, gatekeeper database 109 can translate the
calling party number and the list ID to DN (directory
number) list.  Gatekeeper database 109 would get the
calling party number and list ID in a message.
Gatekeeper database 109 would use those two values (CPN
and list ID) as a key to look up a list of directory
numbers.  Gatekeeper database 109 could either return the
list of Directory Numbers or send a message to the
Directory Numbers.  Gatekeeper database 109 can also
translate the calling party number and the text ID to
text.  Gatekeeper database 109 would get the calling
party number and text ID in a message.  Gatekeeper
database 109 would use those two values (CPN and text ID)
as a key to look up a text string.  Gatekeeper database
109 could either send the message to the receiver(s) or
return just the text string .

In a wireless communication system, gatekeeper
database 109 would interwork with a Wireless SMS.

Switch 101 sends SMS request acknowledgment message
507 to subscriber unit 103 to alert subscriber unit 103
that switch 101 has received an acknowledgment from
gatekeeper database 109.  For wireless applications,
acknowledgments are utilized, and for wireline
applications acknowledgments may or may not be used.
Acknowledgments can be done with either an external
server or utilizing stored messages.  Switch 101

preferably does not store or retransmit SMS messages. Alternately, SMS request acknowledgment message 507 can indicate that the message was not properly transmitted or received.

5      Switch 101 sends display SMS message 509 to subscriber unit 113 and display SMS message 511 to subscriber unit 114.  Display SMS message 509 and display SMS message 511 each include the text portion of SMS request message 501.

10     Switch 101 sends SMS delivery message 513 to subscriber unit 103 and SMS delivery message 521 to subscriber unit 103.  SMS delivery message 513 and SMS delivery message 521 indicate to subscriber unit 103 that display SMS message 509 and display SMS message 511,

15  respectively, to subscriber unit 113 and subscriber unit 114, respectively.

Subscriber unit 103 sends SMS delivery acknowledgment message 517 to switch 101 to indicate to switch 101 that it has received SMS delivery message 513.

20  Subscriber unit 103 sends SMS delivery acknowledgment message 523 to switch 101 to indicate to switch 101 that it has received SMS delivery message 521.

Subscriber unit 113 sends display SMS acknowledgement message 515 to switch 101 to indicate to

25  switch 101 that it has received display SMS message 509. Subscriber unit 114 sends display SMS acknowledgement message 519 to switch 101 to indicate to switch 101 that it has received display SMS message 515.

30     FIG. 6 depicts a call flow diagram 600.  In this embodiment, subscriber unit 103 wants to send a message, such as "No Soccer", to subscriber list L1.  Subscriber list L1 includes subscriber unit 113 and subscriber unit 108.  Subscriber units 103, 113, and 108 are all

35  subscribed to a wireline SMS service.  In the embodiment

depicted in FIG. 6, subscriber units 103 and 113 are located on originating switch 101, and subscriber unit 108 is not located on originating switch 101, but rather switch 107. In this embodiment, switch 101 does not

5  provision subscriber list L1, but rather gatekeeper database 109 provisions subscriber list L1.

Subscriber unit 103 sends SMS request message 601 to switch 101. SMS request message 601 includes a destination portion and a text portion. In this

10  embodiment, the destination portion of SMS request message 601 includes subscriber list L1, and the text portion includes a message of "No Soccer". Switch 101 determines the proper action to take with regard to SMS request message 601 based upon the destination portion of

15  SMS request message 601.

Switch 101 sends SMS request message 603 to gatekeeper database 109. For subscriber units provisioned by switch 101, switch 101 will send them a message including at least the text portion of SMS

20  request message 601. For subscriber units that are provisioned by another switch, switch 101 sends a message to that switch to be delivered to the appropriate subscriber units. When switch 101 does not provision subscriber list L1, as depicted in this embodiment,

25  switch 101 sends the message to a gatekeeper database 109 that provisions subscriber list L1.

Gatekeeper database 109 determines which subscriber units are members of subscriber group L1. In this embodiment, gatekeeper database 109 determines that

30  subscriber unit 113 is provisioned by switch 101, and subscriber unit 108 is provisioned by switch 107. Accordingly, gatekeeper database 109 sends SMS request message 605 to switch 107.

Switch 107 sends SMS request acknowledgment message

35  607 to gatekeeper database 109. SMS request

acknowledgment message 607 communicates to gatekeeper database 109 that switch 107 has received SMS request message 605.

Gatekeeper database 109 sends SMS request
5   acknowledgment message 609 to switch 101.  Gatekeeper database 109 needs to partition subscriber list L1 and send an SMS request message to the proper switches. Gatekeeper database 109 sends a directory number list and the text to switch 101 in SMS request acknowledgment
10  message 609.  This process is similar to that described with respect to FIG. 5.

Switch 101 sends SMS request acknowledgment message 611 to subscriber unit 103 to alert subscriber unit 103 that switch 101 has received an acknowledgment from
15  gatekeeper database 109.  In an exemplary embodiment, acknowledgment messages are utilized in wireless systems. In wireline communication systems, acknowledgment messages are optional.  Acknowledgment messages can be accomplished utilizing either an external server or
20  switch-stored messages.  Switch 101 preferably does not store or retransmit SMS messages.  However, in the situation where a bad acknowledgment message is received, acknowledgment message 611 can also indicate that SMS message 609 was not received properly or were incorrectly
25  transmitted.

Switch 101 sends display SMS message 613 to subscriber unit 113.  Display SMS message 613 includes the text portion of SMS request message 601.

Subscriber unit 113 sends display SMS
30  acknowledgement message 617 to switch 101 to indicate to switch 101 that it has received display SMS message 613.

Switch 107 sends display SMS message 615 to subscriber unit 108.  Display SMS message 615 includes the text portion of SMS request message 601.

Subscriber unit 108 sends display SMS acknowledgement message 621 to switch 107 to indicate to switch 108 that it has received display SMS message 615.

Switch 107 sends display SMS acknowledgement message
5    625 to switch 101 to indicate to switch 101 that it has received display SMS acknowledgement message 621 from subscriber unit 108.

Switch 101 sends SMS delivery message 619 to subscriber unit 103 and SMS delivery message 627 to
10   subscriber unit 103.  SMS delivery message 619 and SMS delivery message 627 indicate to subscriber unit 103 that display SMS message 613 and display SMS message 615, respectively, to subscriber unit 113 and subscriber unit 108, respectively.
15   Subscriber unit 103 sends SMS delivery acknowledgment message 623 to switch 101 to indicate to switch 101 that it has received SMS delivery message 619. Subscriber unit 103 sends SMS delivery acknowledgment message 629 to switch 101 to indicate to switch 101 that
20   it has received SMS delivery message 627.


FIG. 7 depicts call flow diagram 700 for a method of providing near real-time filtered information delivery. In this embodiment, subscriber unit 103 sets up a filter,
25   for example for an airline flight such as Flight 111. Information provider 105 uploads status of flights to gatekeeper database 109, including the departure of Flight 111.  Updates on the status of Flight 111 are sent to subscriber unit 103.
30   Subscriber unit 103 sends SMS filter request message 701 to switch 101.  SMS filter request message 701 includes filter information for subscriber unit 103.  In this embodiment, the filter information relates to the status of a particular airline flight.

Switch 101 sends SMS filter request message 703 to gatekeeper database 109. SMS filter request message 703 includes the filter information from SMS filter request message 701.

5      Gatekeeper database 109 sends SMS filter request acknowledgment message 705 to switch 101.

Switch 101 sends SMS filter request acknowledgment message 707 to subscriber unit 103 to alert subscriber unit 103 that switch 101 has received an acknowledgment
10     from gatekeeper database 109. In wireline communication systems, error processing is optionally done, but for wireless communication systems, error processing is preferably done. Error processing can be accomplished using either an external server or switch-stored
15     messages. Switch 101 does not store or retransmit SMS messages. However, acknowledgment message 707 may indicate that SMS message 703 was not received properly or was incorrectly transmitted.

In the embodiment depicted in FIG. 7, gatekeeper
20     database 109 stores the filters. Alternately, the filters cold be stored by a separate application server. Still further, the filters could be stored by information provider 105. In this embodiment, information provider 105 would send the data, such as flight data, directly to
25     switch 101, which would forward the message to subscriber unit 103 utilizing the Short Message Service.

At this point, the filtered data service has been activated for subscriber unit 103. Depending upon how the filtered data service has been configured, different
30     levels of information can be transmitted to subscriber unit 103 pertaining to the indicated flight, in this case Flight 111.

Information provider 105 sends data message 709 to gatekeeper database 109. Data message 709 includes
35     information pertaining to Flight 111. In an exemplary

embodiment, the data format of information at information provider 105 is not specified, but can be, for example, a traditional database dip, XML-based database interface, or web sorts of interfaces such as CGI or some sort of

5    ASCII/HTML parsing technique.  Information provider 105 preferably determines that an update has been made by utilizing an interrupt or polling process.

Upon notification of new data from information provider 105, gatekeeper database 109 checks filters to

10   determine if an SMS message needs to be sent to any subscriber units.  In the embodiment depicted in FIG. 7, data message 709 includes information about Flight 111, which subscriber unit 103 has indicated, in SMS filter request message 701, that it is interested in.

15   Consequently, gatekeeper database 109 will send this information to subscriber unit 109 via switch 101.  In an alternate embodiment, if information provider 105 was performing the filtering, it would make the determination that information pertaining to Flight 111 needed to be

20   sent to subscriber unit 103, and would send an SMS message including the information to switch 101, which would forward the message to subscriber unit 103.

Returning to the embodiment depicted in FIG. 7, upon receiving data message 709 and determining that a message

25   should be sent to subscriber unit 103, gatekeeper database 109 sends display SMS filter message 711 to switch 101.  Display SMS filter message 711 preferably includes a filter tag set within the message.  The filter tag indicates that no acknowledgment is needed from

30   subscriber unit 103.

Switch 101 forwards display SMS filter message 713 to subscriber unit 103.  Display SMS filter message 713 includes the information related to Flight 111 as sent by information provider 105.

Subscriber unit 103 sends display SMS filter acknowledgement message 715 to switch 101 to indicate to switch 101 that it has received display SMS filter message 713.

5      It should be understood that information provider 105 can continue to send messages relating to Flight 111 to subscriber unit 103 indefinitely, for a predetermined amount of time, for a predetermined number of messages, or for specific predetermined events.  Subscriber unit

10     103 can cancel the service, preferably by sending a message to gatekeeper database 109 via switch 101.

Alternately, subscriber unit 103 can signify, in SMS filter request message 701, the trigger that will terminate the sending of filtered messages to subscriber

15     unit 103 relating to the event specified in SMS filter request message 701.  For example, subscriber unit 103 may want to receive a single message relating to Flight 111, such as when it departs.  Upon departure, the filtered message process is cancelled.  In a further

20     exemplary embodiment, subscriber unit 103 may only be interested in the landing of Flight 111, or may only desire to receive messages relating to Flight 111 during a specified period of time.  Once this time expires, subscriber unit 103 is no longer interested in receiving

25     information about Flight 111.


FIG. 8 depicts a call flow diagram 800.  In this embodiment, subscriber unit 103 wants to send a broadcast message, such as "Washington School is closed today", to

30     all subscriber units that subscribe to the Wireline SMS Terminating feature on the switch.  Call flow diagram 800 depicts a best-effort method for sending broadcast information to a group of users.  In the embodiment depicted in FIG. 8, subscriber units 103, 113, and 114

35     are all depicted as being subscribed to the Wireline SMS

Terminating feature on the switch, switch 101.
Subscriber units 113 and 114 have the wireline SMS
termination feature activated.  It should be understood
that this embodiment can be practiced using a plurality

5   of switches and a plurality of subscriber units, but only
one such switch is depicted in FIG. 8 for clarity.

Subscriber unit 103 sends SMS broadcast request
message 801 to switch 101.  SMS broadcast request message
801 preferably includes an originator portion, a text

10   portion, and a destination portion.  The text portion of
SMS broadcast request message 801 may be limited to a
predetermined size since it is being broadcast to a
plurality of subscriber units.

Switch 101 sends display SMS broadcast message 803

15   to subscriber unit 113.  In a preferred embodiment of the
present invention, switch 101 has a list of directory
numbers that are allowed to send a broadcast message.
Switch 101 checks the originating directory number
against the allowable list to determine whether switch

20   101 will broadcast the received message.

Switch 101 sends display SMS broadcast message 805
to subscriber unit 114.  Switch 101 will send a display
SMS broadcast message to all users who are subscribed to
the wireline SMS terminating feature.

25   Subscriber units 113 and 114 may include privacy
controls which disallow certain messages from being
displayed at subscriber unit 113 and 114.  In the
preferred embodiment of the present invention, the text
portion of display SMS broadcast message 803 and display

30   SMS broadcast message 805 will be displayed in the
receiving subscriber units, even if the subscriber unit
includes privacy controls.

Switch 101 sends SMS broadcast acknowledgment
message 807 to subscriber unit 103.  SMS broadcast

35   acknowledgment message 807 indicates that SMS broadcast

request message 801 has been sent to all subscriber units
subscribed to the Wireline SMS Terminating feature on
switch 101.   In the exemplary embodiment depicted in FIG.
8, SMS broadcast acknowledgment message 807 indicates

5    that SMS broadcast request message 801 has been sent, but
not necessarily that it has been received by all
subscriber units.   In this embodiment, the subscriber
units are assumed to buffer messages, so the chances of a
subscriber unit missing a message is minimized, even

10   without the utilization of acknowledgment messages.
Eliminating acknowledgment messages in this exemplary
embodiment is desirable since the conditions that
triggered the sending of the broadcast message, such as
bad weather conditions, would very likely cause other

15   institutions to send a similar message.   By eliminating
acknowledgment messages, network traffic is minimized at
a time when bandwidth is needed.

    While this invention has been described in terms of
certain examples thereof, it is not intended that it be

20   limited to the above description, but rather only to the
extent set forth in the claims that follow.
    We claim: